

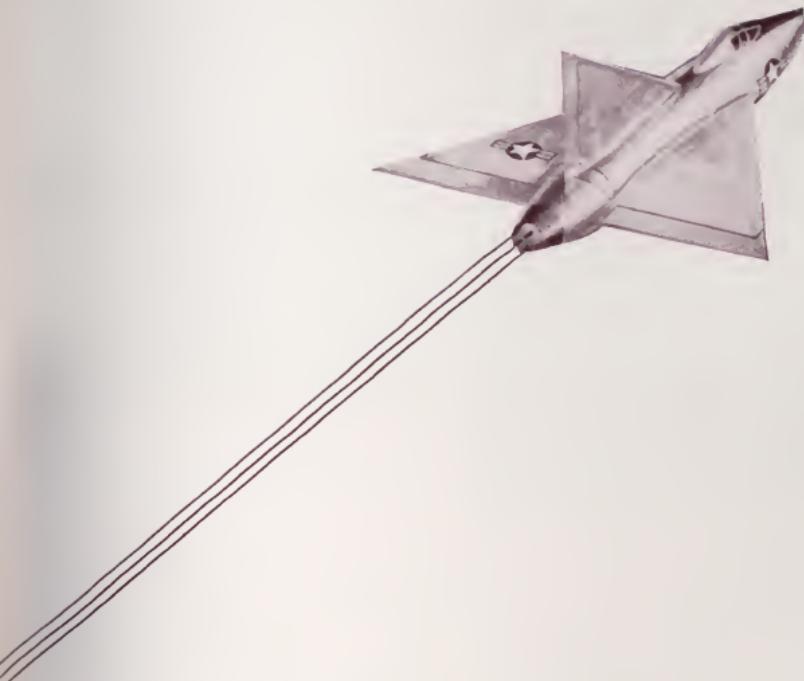
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VOL. 14

NOVEMBER 1954

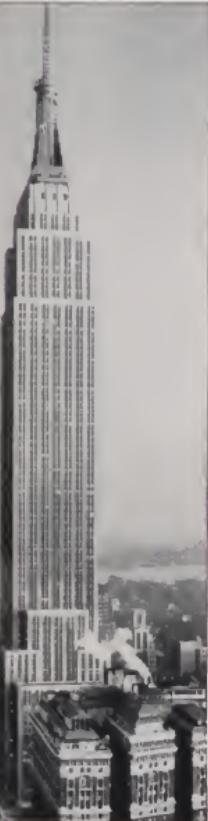
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A MESSAGE TO  
COLLEGE ENGINEERING  
STUDENTS

from J. M. Wallace, Manager, Meter Div.,  
Westinghouse Electric Corporation  
*University of Pittsburgh, 1935*



## To the man who wants more than a job

You and I know that getting a job is not a problem these days. Industry needs thousands of young engineers.

But the man who wants more than a job might well pause and consider just how he is going to find his special opportunity. It cannot be found everywhere.

The man I'm talking about wants interesting work with a future, yes—but also something more. He is determined to help make the world a better place in

which to live—and wants a job that will enable him to do this. He is co-operative in his work, but demands the dignity of being treated as an individual. This man had high purpose when he elected a career as an engineer.

I know this man. He's many men at Westinghouse. He's an engineer's engineer.

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Salary is commensurate with the individual's ability and experience. Tuition, admission fees and books for university attendance are provided. Provision is made to assist in paying travel and moving expenses from outside Southern California.

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University of Southern California



University of California at Los Angeles

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Each appointment is for twelve months and provides a cash award of not less than \$2,000, a salary of not less than \$2,500, and \$1,500 for tuition and research expenses. A suitable adjustment is made when financial responsibilities of the Fellow might otherwise preclude participation in the program. For those coming from outside the Southern California area provision is made for moving and transportation expenses.

### HOW TO APPLY



for the Howard Hughes Fellowships in Science and Engineering: Address all correspondence to the Howard Hughes Fellowship Committee

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SCHOOL OF ENGINEERING, THE GEORGE WASHINGTON UNIVERSITY

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## ON OUR COVER

An experimental delta-wing jet fighter built for the Air Force by the Consolidated Vultee Aircraft Corporation is shown in flight. One of the more recent developments in the training of pilots for this and other types of jet aircraft is explained on page eight in the article "The Instructor was an Analogue Computer."

## FRONTISPICE

Westinghouse engineers who designed this disconnect switch say it is capable of handling 330-kv and of withstanding a power surge, such as might be caused by a lightning stroke, of 1.3 million volts. The device can be operated manually or by an electric motor and will be used on high voltage utility circuits for isolating other electrical equipment to permit inspection and maintenance in complete safety.

—COURTESY WESTINGHOUSE ELECTRIC

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# Accreditation

BY DEAN MARTIN A. MASON



*The editor has asked that I write a few words about accreditation--what it is, what it means, its importance.*

In its simplest and most important aspect accreditation is the acceptance, by some responsible body, of a school or curriculum as meeting some minimum standards established by the body. Accrediting derives from one or more of many bodies; the two of prime pertinence to us are: the Middle States Association of Secondary Schools and Colleges (an association of schools deriving status from its members); and the Engineers Council for Professional Development (ECPD), deriving status from the professional engineering societies who support the Council. Middle States accredits SCHOOLS, though accepting them as members of the Association; ECPD accredits CURRICULA (not schools), through a process of periodic comparison of curricula with a schedule of qualitative standards established by ECPD.

Basically, accreditation means acceptance, by the accrediting body, of the adequacy of the facilities, philosophy, faculty, financing, etc., of a school to provide the educational opportunity purported to be offered. Experience has shown that it does not guarantee quality of education. It does provide a mechanism for quick comparison of schools or curricula in terms of certain minimum qualitative standards, without a guarantee that the standards employed or accreditation granted are significant in terms of educational quality.

Accreditation must be sought and paid for (expenses of inspection or membership costs). It is a matter of choice of the school, which may decide not to seek accreditation for various reasons. However, the disadvantages of non-accreditation (actually meaning non-acceptance by reputable schools or groups) almost require accreditation effort.

An interesting sidelight on accreditation of engineering curricula has developed. Since registration of professional engineers has become a requirement for the private practice of engineering, the question of adequate training has received much attention by state licensing boards. For some years past, various Boards of Registration have accepted graduation in ECPD accredited curricula as presumptive evidence of adequate training; but in recent years there has developed a tendency not to rely on ECPD accreditation. In fact, some Boards no longer require ECPD accreditation, relying rather on their own evaluations. As a result, ECPD is now scurrying about in efforts to improve the status (and presumably qualify) of its accreditations.

It is obvious that the merit of accreditation is a direct function of the merit of the group or body granting accreditation. There are some who have felt that accrediting bodies themselves might well be accredited.

For the benefit of those who are interested in the problems of accreditation (and the problems are many), it can be noted that President Marvin has been one of the leaders of thinking on this subject. You can be justly proud of the work he has done, and assured of the keen appreciation by the school of the values and

*(Please turn to page 26)*

## ***The Story of Flight Simulators***

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# **The Instructor Was An Analogue**



An artist's interpretation of a mobile flight simulator. This is one of the trainers referred to in this article.

*Earl Bass is employed, as a publications engineer, by the Engineering and Research Corporation of Riverdale, Md. His duties consist mainly of the preparation of Handbooks for the operation and maintenance of electronic flight simulators. These books include thorough analysis of the theory of operation of the circuitry constituting the analogue computers, which in turn, constitute the final product. In previous positions Earl's titles include electronics technician, production foreman, and engineering test and inspection foreman. He obtained an AB degree from Catholic University and is currently working towards a MS degree in Engineering here. This paper was originally submitted as a membership requirement for Sigma Tau.*

# Computer

The use of electronic computing systems to perform various functions is a comparatively new and rapidly expanding field. There presently exist two broad categories of computers, digital and analogue. The digital computer, has become widely publicized through the so-called "magic brain" type systems and its capabilities and limitations are fairly well known. The analogue computer, on the other hand is not as highly publicized and few people outside the engineering field know its theory of operation or its capabilities.

There are many devices that employ analogue computers, one of the largest fields probably being that of training aids. One practical example is the flight trainer designed to train personnel, with complete realism, in all phases of aircraft flight.\*

The primary purpose of a flight trainer is to provide flight crew members with safe, effective, and controlled training in flight operations, instrument uses, communications and navigational aids procedures and emergency situations that they can encounter in the actual aircraft. These simulators, the electronic equivalent of the real aircraft, provide an illusion of flight that is complete, down to passing clouds and lightning. The pilot hears the usual engine and propeller noises, feels the airplane bouncing under him when flying through rough air, feels the slipstream reacting on his controls, listens to radio beacons, talks to the tower by radio, and hears static on his radio

as lightning flashes outside his windows. Structural vibration, realistically varying in frequency and amplitude, makes the trainer feel "alive", adding greatly to the psychological impact. Veteran pilots who have "flown" simulators have been unanimous in their enthusiasm for this type of trainer, and were amazed to find that even the characteristic propeller "chirp" at idle speeds was included.

The pilot and co-pilot, by repeated "flights" in this type of trainer can be trained to react correctly to all situations that they are likely to encounter in the aircraft. Any combat airplane is dangerous for inexperienced pilots, and the first major error a pilot makes in an airplane new to him is usually his last. If the student-pilot makes an error which would result in a crash in an airplane, the simulator also "crashes", but leaves the pilot blushing instead of bleeding. After a few choice words from the instructor, the pilot is able to start his flight again, having learned one more mistake to avoid. Marginal maneuvers, such as engine failure on take-off, which might endanger an airplane can be performed safely in the simulator. By observing the effects of the maneuver on the performance of the stimulator, the student-pilot can learn the full capabilities and limitations of the airplane.

The flight simulators are basically electronic computers in which all the forces acting on the airplane in flight, including the pilot's control forces, are considered as items in a number of equations. The computers solve

\* Trainers of this type are being built by the Engineering Research Corporation of Hyattsville, Maryland.

(Please turn to page 20)

## Were You Here?

Searching through the files of the **Mechele-civ** is like taking a trip back through the past in the engineering school because from the time of its publication the magazine has served as a chronicle of the engineering school and one can see the magazine and school growing at the same time.

The **Mecheliciv** first saw the light of day in July 1942 and it was, apparently, a war baby born of a rapidly expanding engineering school and an accelerated program for training engineers in order to meet the war-time demand.

And why was the **Mechelecv** being published in July you might ask? It is only published during the fall and winter terms now. The reason was that the engineering school in July 1942 was a beehive of campus activity because of the unusual circumstances which prevailed at the time. All societies and fraternities as well as the **Mechelecv** continued their activities throughout the summer months.

The first issue was a very modest journalistic endeavor; it consisted of four dittoed pages, on one side only. The quality of the writing in all the early issues was excellent, as it still is, but there is a noticeable difference between the early editorial style and that of the present. The early editorial style was informal, as compared to that of the magazine you are now holding in your hands, and the magazine was newsy and lively. It was mainly concerned with people and their antics. It contained a great deal of gossip about who was who and what they were doing. During the transformation from the dittoed stage through the mimeographed stage, to the slick paper issue of today, the editorial style became more formal.

In all of Volume I, the banner was drawn freehand, by some aspiring engineering no

## It's Going To Be A Long, Hard Winter

By Kingsley Brown, B. M. E. '55  
Vice Preisident, Sigma Tau

Now that everyone is registered, settled down and, and finding out that study night is every night, it might be a good time to remind you of the Sigma Tau counselling service. So things aren't going too well; the books don't make sense, the professor's lectures don't help much, and you should have taken Mummy-trapping 101 instead of Advanced Abstract absurdities. But still, others have passed the course, so you might just as well continue to eat your head against the wall.

You, sir, are ready for the Sigma Tau counsellee service. You aren't stupid, or you never could have gotten into the School of Engineering. Probably, your trouble is just that you don't know how to attack this particular subject, or that you haven't acquired proper study habits. These are the most common causes of trouble that the Sigma Tau counselors have found.

Don't hesitate if you are having troubles—contact Sigma Tau through your professors or any Sigma Tau member you know. A Sigma Tau man who has an interest in your subject or who has done particularly well in it will get together with you and your professor and try to determine what your trouble is. He and the professor will then recommend remedial action, and help in carrying it out.

Perhaps you just need a more suitable place to study, or need help on some small detail that will clear up the whole subject. Whatever is needed, Sigma Tau will endeavor to provide it; tutors, extra reading material, moral support can all be obtained.

Remember, we in Sigma Tau are interested in helping you, because by doing this we also help ourselves and the School of Engineering. We are proud of the help we have been able to provide in the past, and hope we can be of more service in the future.

doubt, and the typewritten masterhead listed  
red Holcomb, as editor; George Pida, as  
publisher and George Kalv, as printer.

During the search through the old files, names which have a familiar sound keep recurring. The first was that of the former publisher George Pida, B. E. E., 1947, who is now working at the Naval Research Laboratory and is also a faculty member in the capacity of lecturer in Electrical Engineering.



Part of page one of the 1944 MECHELECI.

# "Opportunity for the Asking"

By Sam Mawhood, B. E. E. '56

In spite of all the complaints heard on campus about the lack of opportunity and the difficulties of finding the right kind of job, Washington has an almost ideal situation for the young engineering student. Not only do we have the opportunity to study under some of the finest professors and instructors found anywhere in the country but no where also in the country does the inexperienced engineering student have the opportunity for the top notch practical training and experience as offered by both private industry and the various research and development branches of the U. S. government. Nowhere else can you find summer or part time winter positions where you are allowed to pick your type of work, work the hours most suitable to your schedule, take responsibility with assistance from experts, and receive very close to the pay of the full time graduate engineer.

These jobs are not only in abundance but are of the most desirable type possible as is evidenced by the number of out of town students who converge in droves on Washington during the summer months to work for the National Bureau of Standards, the Naval Research Lab., the Bureau of Aeronautics and the innumerable other government agencies and private concerns located here. It would be impossible to give job descriptions or even to list the various types of jobs that are available, so we shall limit the discussion to the general program of one agency, The National Bureau of Standards.

Jobs available at the Bureau are for the most part let on open examination given each year near the end of the spring term. The examination is of the objective type and very little technical information is necessary.

The range of jobs available within this one agency is tremendous. The Bureau is engaged in fundamental and applied research in physics, chemistry, mathematics, and engineering. Projects are conducted in thirteen fields: electricity, optics and metrology, heat and power, atomic and radiation physics, chemistry, mechanics, organic and fibrous materials, metallurgy, mineral products, building technology, applied mathematics, electronics, and radio wave propagation. The Bureau has custody of the national standards of measurement and conducts research leading to the improvement of scientific and engineering standards and of techniques and methods of measurement. Testing methods and instruments are developed; physical constants and properties of materials are determined; and technical processes are investigated.

Most of the jobs in the various departments are available to everyone, however some of the jobs, primarily in research do require security clearance. If you are interested in this type of work you will find it necessary to apply for the job several months in advance as a security clearance takes time to complete.

To assure that the student trainee is in the job which holds the most interest for him,

*(Please turn to page 24)*



An aerial view of some of the buildings at the National Bureau of Standards.

# NEWS AND VIEWS

## MERCHANT MARINES HEAR MASON



Graduation day ceremonies at the United States Merchant Marine Academy are pictured here. On August 6, Dean Mason delivered the graduation address at the Merchant Marine Academy. Dean Mason is Chairman of the Academic Advisory Board there.

## THETA TAU CELEBRATES GOLDEN ANNIVERSARY— PROFESSOR AMES HONORED

At the Dyckman Hotel in Minneapolis, Minnesota, on October 13, 14, 15, and 16, members of Theta Tau gathered to celebrate the founding of the Fraternity fifty years ago.

Members attending from G. W. were Professor Ames as delegate from the Washington Alumni, Paul Kuzio as delegates from the active chapter, and Bob van Sickler as the alternate

delegate from the active chapter.

The Fraternity elected Professor Ames as Grand Scribe of Theta Tau. This is the first time this honor has been conferred on any member other than the founder of the Fraternity, Eric Schrader. Professor Ames is a past Grand Regent of the Fraternity.

## ODK TAPS COUNCIL PRESIDENT

Last week at the Homecoming Dance in the National Guard Armory Omicron Delta Kappa tapped Leon King, President of the Engineers' Council. ODK is an honor society recognizing outstanding leadership on the University campus. Many of the University faculty and administration are members of the society including President Marvin, Professor Ames, and Professor Walther.

Leon King was elected to membership because of his contributions to the Engineers' Council, his work as Business Manager of the Mecheleciiv last year, and on the basis of his membership in Sigma Tau, Pi Delta Epsilon, and the IRE.

## AMES APPOINTED TO FELLOWSHIP COMMITTEE

President-elect Monteith of the American Institute of Electrical Engineers has appointed Professor Ames as one of the three new members of the Charles LeGeyt Fortescue Fellowship Committee. The appointments, as confirmed by the Board of Directors are for a three year term.

*(Please turn to page 22)*

## FALL REGISTRATION

Professors Ames and Hanrahan register students for classes in Electrical Engineering while Mike Brady signs up members for the AIEE-IRE Student Branch.

Students find time to compare summer activities and fall schedules while awaiting interviews with Dean Mason.



# ENGINEERING NEWS

## A WELDER FOR HOME USE



The Lincoln Electric Company announces a new method of welding that eliminates skills normally required and promises to make it possible for the rapidly growing number of home fix-it-yourself and hobby craftsmen to work with metals as readily as with wood.

SELFWELD, as the product is called, is said to eliminate the difficulties that would be encountered normally by the amateur in learning the skills of manipulating the welding electrode and controlling the arc. The new method employs a special welding electrode and special electrode holder. To make a weld, the tip of the electrode is simply held against the metals to be joined at the point where the weld begins, a switch on the holder is pressed to fire the electrode and the weld is made automatically.

Lincoln has also developed a new 100 ampere welding machine for use with SELFWELD. The machine, complete with accessories, electrodes, and SELFWELD holder, costs less than \$100.

## MOVING SIDEWALK

The world's first commercial moving sidewalk has been installed in Jersey City, N. J. General Electric supplied the electrical system to operate the 227-foot conveyor, a sort of horizontal escalator capable of handling 10,400

passengers an hour.

Operating between the stations of the Erie and the Hudson and Manhattan Railroads, the belt moves in the direction that traffic is heaviest. Riders can step on or off, for it moves at only half normal walking speed, with handrails moving at the same rate.

The sidewalk is expected to speed up the flow of traffic and reduce congestion among the thousands of commuters using the stations. New York City and Cincinnati are also considering plans for solving pedestrian traffic problems with similar conveyor belts.

## COLD LIGHT



The General Electric Corporation has come up with a new light source known as "electroluminescence" which glows without producing heat, thus operating on an infinitesimal amount of electric power.

Up to now, the only useful adaptation of electroluminescence has been the lighting of clock faces. Future adaptations are expected in the illumination of instrument panels for autos, boats, and aircraft.

The light is produced by spraying a suspension of suitable solid phosphor on one side of a sheet of conducting glass. Then an alternating current is passed through the phosphor coating by means of two electrodes placed on the surface of the phosphor. Phosphor colors can be produced in the range from orange to blue and including white.

*(Please turn to page 18)*

# ALUM NEWS

EDWIN S. HOFFMAN, B. S. in E. E. 1913, recently retired from the Navy's Bureau of Ordnance, after serving as a Government employee for nearly 40 years.

\* \* \* \* \*

E. D. WALEN, B. M. E. 1918, is the newly elected President of the National Association of Wool Manufacturers in New York. Mr. Walen is Vice President of Pacific Mills in Lawrence, Mass.

\* \* \* \* \*

MELVIN H. FRIEDMAN, B. S. in E. E. 1928, L. L. B. 1932, who has been with the U. S. Patent Office for 26 years, has been approved by the U. S. Senate to be an Examiner-in-Chief with that office.

W. DEE SHEPHERD, B. S. in E. 1940, has been named Sales Manager of the Westinghouse Electric Corporation Atomic Power Division. Mr. Shepherd is at the Atomic Equipment Department plant near Cheswick, Pennsylvania.

\* \* \* \* \*

ERWIN E. SHALOWITZ, B. C. E. 1947, is now serving as structural engineer-project manager in the Research Division of the Bureau of Yards and Docks. During the past year he was on the Research and Development Committee of the American Society of Civil Engineers (District Section).

\* \* \* \* \*

JACK GLESSNER, B. M. E. 1948, is now in charge of compressor de-

sign in the development department of the Elliott Company. Mr. Glessner obtained his M. S. in M. E. at Carnegie Tech in June 1953.

\* \* \* \* \*

LAWRENCE R. BROWN, B. S. in E. 1949, has been recently appointed Assistant Manager of the Patent Department at Burroughs Corporation Research Center in Paoli, Pennsylvania.

\* \* \* \* \*

ROBERT B. BUCKLEY, B. S. in E. 1949, Lieutenant (j.g.), was presented a Navy letter of Commendation for meritorious service while serving on the Minesweeper U. S. S. CONDOR off North Korea in 1953.

\* \* \* \* \*

WILLIAM J. J. KLEIN, B. E. E. 1949, is now a member of the technical staff of the Radar Division, Hughes Research and Development Laboratories, Culver City, California. He was formerly an electronic scientist with the Naval Research Laboratory.

\* \* \* \* \*

WARREN A. FRICK, B. C. E. 1951, has completed a three-year highway engineering course with the Bureau of Public Roads and has been assigned to duty at the Illinois District Office.

\* \* \* \* \*

JOSEPH REKAS, B. C. E. 1951, also has completed a three-year highway engineering course with the Bureau of Public Roads and has been assigned to duty at the Bridges Branch of the Washington Office.

## IN MEMORIAM

ROBERT J. POTBURY, B. S. in E. (w.d.) 1912, died in Washington last April. Mr. Potbury was employed by the Navy's Bureau of Yards and Docks for 41 years.

\* \* \* \* \*

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# ENGINEERING PERSONALITIES

DR. JAMES H. TAYLOR



Dr. James H. Taylor is Executive Officer of the George Washington University Mathematics Department. He is a campus personality who is well known to engineering students. He needs no introduction since all engineering graduate degree candidates and undergraduates will either be in one of his classes or will have occasion to consult him.

The list of honorary, scientific and fraternal organizations of which he is a member are too numerous to enumerate in this column but some of the better known are Phi Beta Kappa, Sigma Xi, The Cosmos Club, The American Mathematical Society, Mathematics Association of America, The Washington Academy of Science and the Masons.

He is the author of numerous scientific papers concerning calculus variations and differential geometry and the textbook *Vector Analysis*, which has at this time gone through five printings and is currently in use at this University.

In World War I he volunteered for Army service, completed his officers' training course at Fort Snelling, Minnesota, and served two years as a Second and First Lieutenant in the infantry. In addition he has served as a civilian mathematical consultant to the Army.

Performing the maintenance on his home and grounds, which he does skillfully, since he had extensive construction work experience as a student, does not allow much time for hobbies, but he occasionally finds time to spend a few days camping and exercising his skill cooking over camp fires.

If, as a student you have occasion to consult him concerning your problems you will find him to be a calm, poised, soft-spoken individual, wreathed in pipe smoke and leaning back in

LEON KING

Leon King was born in West Virginia and received his secondary education in the Mount Hope Schools.

Every engineering school needs at least one personality like Leon for the purpose of keeping alive interest in student affairs. Much of what the engineering student activity in this school is today is largely to the credit of his tireless efforts. It is fitting to say that no one person has contributed more to the student organization of this school.

He is 1954-1955 President of the Engineers' Council and has held the positions of advertising and business manager of the *Mecheleev*. In addition he is Vice Chairman of the student branch of the Institute of Radio Engineers and he still finds time to be Treasurer of Pi Delta Epsilon.



He entered active service in the Air Force in 1943 and his war time training in the Air Force radio school led directly to his interest in electrical engineering.

One would never suspect that hidden behind this gentle personality

(Please turn to page 16)

his chair, who is not given to rendering advice based on hasty judgment. For some reason not known to us the problems of the undergraduate bring out all his endearing patience and light the twinkle in his eyes.

The contribution of the utmost he can in the field of engineering education is his most vital professional interest and we engineers are fortunate to reap the benefits of his extensive contributions in this field. Dr. Taylor's services as a member of the engineering faculty are in keeping with the traditions of this school of providing the best possible engineering education.

CARL McCALL

Carl P. McCall is one of those legendary students whose name, because of his prodigious feats, will be spoken in solemn tones by awed freshmen, years after he has graduated. Not the least of his accomplishments is his scholastic ability. Carl is one of those fortunate persons who can, while carrying 16 to 18 semester hours, maintain a Quality Point Index above 3.5. The amazing thing about this is that he does it with no apparent effort.

Carl is not easy to get to know, but once one has broken through his reserve, one will find him to be an extremely good-natured, thoroughly likeable person. He is so well liked by the people who know him intimately that it is unfortunate that he is not a person with a more extroverted personality. One exception to this has been noted however. At the engineering school social functions he drops his business-like attitude, cuts loose and thoroughly enjoys himself. It might be added: so do all the people in the immediate vicinity.

Another characteristic which sets him apart is that among this casually dressed group of engineering students he stands out by virtue of the neat manner in which he dresses.

During his attendance at the School of Engineering he has been active in engineering student affairs. He is a member of Sigma Tau and was initiated into Theta Tau this fall. Like all good engineering students he is a member of a professional society—in this case the Institute of Radio Engineers, and he presently serves as the IRE representative to the Engineering Council. We would like to add that the IRE interests are in good hands.



He leaves here in 1955 with a fresh sheepskin which says he is a Bachelor of Electrical Engineering—a title which he has rightfully earned and which he richly deserves.

# SOCIETIES AND FRATERNITIES

## THETA TAU



In celebrating the 50th Anniversary of the founding of Theta Tau Fraternity the Gamma Beta chapter held its semi-annual initiation ball and banquet at Brook Farm Restaurant on October 16.

The highlights of the evening were the talks by Profs. Miklosky and Walther, the skit presented by the new initiates, the take off on the "Whiffenpoof" song by the new members, the talents of Sam Mawhood playing his accordian.

The new members who were initiated in the afternoon were: Mike Brady, Felix Costanzo, Jack Crenea, Warren Crockett, Donald Keever, Carl McCall, Harlan Oelke and William Stamper.

## AIEE - IRE



The first meeting for the school year 1954-1955 of the AIEE-IRE was held on October 6. Back business shared the meeting with an interesting talk on Germanium Transistors given by Prof. Abraham. The talk covered theory and construction of transistors and was given via tape recording and slides shown by Derrill Rohlfs.

On October 22 and 23, chairman Harry Brandler, secretary Michael Brady and Professor Hanrahan attended the Eastern Regional conference of the AIEE student chapters at the University of West Virginia at Morgantown, West Virginia.

*(Please turn to page 24)*

## Engineers Your Move

The men we seek are experts in their specialized fields, capable of filling responsible engineering positions with MELPAR, a leader in research and development. Perhaps one of these men may be you. We invite you to learn about our long-range military and industrial programs.

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## LEON KING

*(Continued from page 15)*

is an airman who performed combat service as a central fire controlman in B-29's, a position of vital importance since the safety of the plane and entire crew depends on the unerring judgment of the central fire controlman whose decision concerning into which fire sector to switch fire control must be nearly instantaneous.

If you want to kindle the fires in Leon's eyes there are several things which you can mention which will do it. One is the mention of hunting, which he loves, not for the sake of hunting alone, but because he enjoys being in the woods. Bring up the subject of flying and you will surely spend several hours hangar flying. Mention student participation in engineering school affairs then step aside because this is the topic on which he has the strongest feeling.

Leon graduates in 1955 with a B. E. E. degree and his departure will be our loss. Our greatest hope is that somewhere in the engineering school is a personality of sufficient magnitude to furnish the leadership, inspiration and vitality so necessary to keep the engineering students' spirit alive and progressive.



1931 — revolutionary Boeing B-9

1954 — Boeing B-52, America's outstanding heavy jet bomber

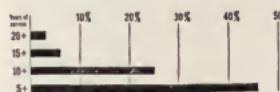
## Leadership is a long-time tradition at Boeing

In 1931, Boeing engineers designed the B-9, a revolutionary low-wing bomber that could outdistance any contemporary pursuit plane.

Today, they've produced the free world's outstanding heavy jet bomber, the B-52, and America's first jet transport. Boeing also builds the record-breaking B-47 medium jet bomber, conducts a major guided missile program, and research in nuclear power for aircraft.

These growing programs mean expanding opportunities at Boeing for engineers of virtually **EVERY** type, including mechanical, civil, electrical

and aeronautical. It also means plenty of room for advancement. Boeing, which now employs more engineers than even at the peak of World War II, promotes from within, and holds regular merit reviews to give you individual recognition.



As the chart shows, 46% of Boeing's engineers have been here for five years or more; 25% for 10 years; and 6% for 15 years, and many have been

with the company 25 years or longer.

Boeing offers engineers an unusual variety of experience, from applied research to production design, from work with new materials and techniques to co-ordination of a vast subcontracting program which provides contacts with a cross-section of U. S. industry.

Boeing also helps engineers continue their graduate studies, and reimburses them for tuition expenses.

*For further Boeing career information, consult your Placement Office, or write:*

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- 1 Steel is 3 times stronger than gray iron.
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## **CUTS COSTS WITH WELDED STEEL**

**P**RODUCTION costs largely determine whether a design is acceptable for manufacture. The successful designer therefore, seeks out every opportunity to eliminate unnecessary expense from his engineering recommendations.

Because steel is stronger, more rigid than iron, yet costs a third as much per pound, costs on many products such as the two shown below can be cut as much as 50%.



**COSTS 30% LESS**—Machine bracket is welded from 10 gauge metal. Weighs half of original cast design. Cut is stronger, more rigid. Costs 30% less to produce.



**COSTS 45% LESS**—Feeder roll is built from standard channel welded to steel discs. Steel design eliminates breakage, weighs half of former casting. Saves 45% on cost of manufacture.

### **Ideas for designing in welded steel**

Bulletins and handbooks on latest design procedures are available to engineering students. Write:

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ARC WELDING EQUIPMENT**

### **ENGINEERING NEWS**

*(Continued from page 13)*

### **POWER TRANSISTOR**



A combination of mounting and physical design has made possible a germanium power transistor with a one-watt rating. A black, rubbed surface provides cooling capacity for the one-watt collector dissipation rating. Additional cooling is accomplished by fastening the unit in thermal contact with the chassis.

This new type transistor will be applicable to any low-frequency circuit, such as class A amplifiers, where output power is desired.

*(Please turn to page 26)*

### **Interview Schedule**

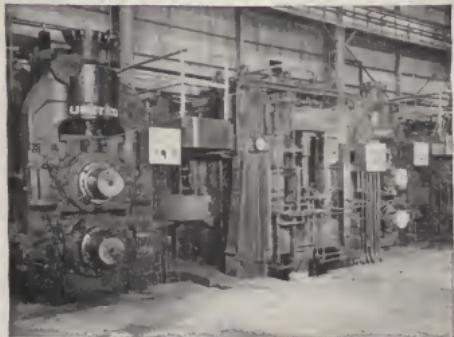
#### **Organization**

#### **Scheduled Visits**

C & P Telephone Co. (entire Bell System)	Nov. 9, March 10
Continental Baking Co. ....	Nov. 15
American Blower .....	Nov. 16
Crown Central Petroleum Co. ....	Nov. 16
Martin Aircraft .....	Nov. 18
North American Aviation .....	Nov. 19, March 18
Potomac River Naval Command .....	Dec. 9, Feb. 25
Naval Research Laboratory .....	Dec. 13, March 22
Wright Air Development Center .....	Jan. 5
W. L. Mason Co. ....	Jan. 18
Bendix Radio .....	Feb. 11
Pratt & Whitney Aircraft .....	Feb. 17
Group Interview, Telephone Co. ....	March 9 (late afternoon)
Chance Vought Aircraft .....	March 11
General Electric .....	March 14 & 15
ERCO .....	March 18
National Security Agency .....	March 23
Western Union .....	March 25
McDonnell Aircraft .....	March 28
Aberdeen Proving Grounds .....	April 5

Another page for

# YOUR BEARING NOTEBOOK

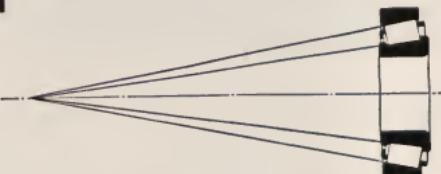


## How billet mill gets extra bearing capacity in same space

Engineers who designed this 10-stand billet mill specified that the roll necks be mounted on Timken® Balanced Proportion bearings. That's because Timken Balanced Proportion bearings have load ratings up to 40% higher than same-size bearings of older designs. And they make possible a 50 to 60% increase in roll neck strength which means greater rigidity and higher rolling precision.

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## Want to learn more about bearings or job opportunities?

Many of the engineering problems you'll face after graduation will involve bearing applications. For help in learning more about bearings, write for the 270-page General Information Manual on Timken bearings. And for information about the excellent job opportunities at the Timken Company, write for a copy of "This Is Timken", The Timken Roller Bearing Company, Canton 6, Ohio.

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## THE INSTRUCTOR WAS AN ANALOGUE COMPUTER

(Continued from page 9)

these equations instantly and continuously, and the answers provide instrument indications identical to those of the aircraft. This type of simulation is far more complete and faithful than the types formerly in use, for it is derived from the fact that airplanes follow definite physical laws and mathematical equations which can be solved by servo-mechanisms.

The performance of the aircraft depends upon its design, the atmospheric conditions in which it operates and the pilot's manipulation of the many controls. By operating the flight and communication controls in the trainer cockpit (a duplicate of the actual cockpit of the aircraft being stimulated), the pilot and co-pilot activate various electrical mechanical, electronic, and electro-mechanical units throughout the trainer.

These units, in turn, produce the same cockpit instrument and control indications and most of the aural, visual and other physical effects that would be normally encountered during an actual flight. The aural simulation consists of the signals heard over the pilots and co-pilot's head-phones and also the engine and flight noises. The engine and flight noises

include noises such as engine exhaust, engine sputter, backfire, propeller "chirping" and tire screech. The visual simulations include the effect of day or night flight with random cloud and lightning effects. Lightning simulation is also accompanied by the simulation of static on the radio equipment.

After a pilot has made satisfactory progress on routine flights, the instructor can cause a number of failures in order to teach emergency procedures. One switch on the instructor's console may cause an engine to fail, another may cause loss of hydraulic pressure and consequent loss of control over the landing gear, flaps, and brakes, and still another switch may leave the pilot without any communications. The manner and speed with which a pilot acts to overcome the dangerous effects of a failure often determines whether he can save the plane and its crew or not. If a pilot first encounters a failure in the air after only verbal or text book instruction in the procedure to be followed, it is possible that under the stress of circumstances he will make a fatal error. But if he has been subjected to the failure in a flight simulator, the training and experience afforded by the simulator makes it far more probable that he will follow emergency proced-

(Please turn to page 22)

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You study in a fine school, taught by outstanding professors. Does it make sense to work with inferior tools? Order CASTELL, world's standard of quality, from your College Store, stationer or art supply store.



"Do you neck?"  
"That's my business."  
"At last, a professional."

o o o

Co-ed: Say when.  
M. E.: How about after this drink?

o o o

First drunk, very belligerently: Pick that up.  
Second drunk: Make me.

First drunk: You're not my type.

o o o

"Let's cut M.E.I."  
"Can't, I need the sleep."

o o o

C. E.: I dreamed of you last night.  
Girl: Did you?

C. E.: No, you wouldn't let me.

o o o

"Pardon me for slapping you; I thought that you were trying to steal my sorority pin."

o o o

A city slicker was employed on a farm and after about a week he went to the farmer and suggested that they get rid of a certain cow. Seems he wouldn't give milk.

o o o

Dancing has recently been defined as using the column formula for beam theory.



### **WAX WORKS...**

Until a few decades ago, the principal users of wax were the candlestick makers. Today's diversified demands for wax put it in the class of modern industrial miracles.

Go into a super-market . . . see how wax works in the packaging and protection of milk and dairy products, cereals, baked goods, frozen foods. Think of its use in drug and cosmetic products . . . cups, crayons and carbon paper . . . polishes, preservatives and paper matches . . . And the number of industrial applications defies accurate calculation.

### **TOO BIG FOR BEES...**

The ancients knew the physical properties of wax . . . and bees supplied the raw material. What then spurred this century's growth in production to more than a half-million tons a year?

The answer lies partly in the petroleum industry's desire to find more profitable applications for one of its products . . . partly in the desire of other industries to improve their processes and products.

### **AMERICA WORKS LIKE THAT...**

Here, industry is paradoxical. It is independent, yet

dependent . . . cooperative, yet competitive. It strives to make more money, yet is always seeking ways to keep costs and prices down.

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## NEWS AND VIEWS

*(Continued from page 12)*

### FRESHMEN ELECT DELEGATES

Under the provisions of the Engineers' Council Constitution, two delegates from the freshman class were elected last month to the Engineers' Council. One was elected from each of the two M. E. 1, Freshman Orientation, classes.

The delegate from the morning class is Bob Shuken; from the evening class, Raymond J. Sullivan. The two delegates assumed office on Wednesday, October 27.

### ENGINEERS' COUNCIL AMENDMENTS RATIFIED

The new Engineers' Council amendments to their constitution that were proposed this summer have been ratified by five of the six member organizations. The sixth member organization, the A. S. M. E. ratified only part of the amendments. Since two-thirds of the organizations have ratified the amendments, they will go into effect as of the Council meeting of October 27. These amendments, if carried out properly by the council, should be the means of obtaining more student participation in the Engineering School activities.

## MECHELECV AT E. C. M. A.

Professor Ames, Bob van Sickler, and Tom Flanagan represented the Mechelecv at the Engineering College Magazines, Associated Convention in Minneapolis, Minnesota, October 7, 8 and 9. The program for the annual convention included a review of the year's activities, study and discussion of the problems inherent in the publication of a college magazine as well as discussions and demonstrations of ways of improvement for the coming year.

The E. C. M. A. now consists of thirty-three member magazines from colleges all over the country. The Mechelecv was admitted to the association last year.

### THE INSTRUCTOR WAS AN ANALOGUE COMPUTER

*(Continued from page 20)*

ure correctly when he encounters the failure in actual flight.

The type and extent of the training that can be provided with this type of device is primarily a function of the need of the pilot and the skill of the instructor. The trainers are designed to enable the instructor to set up the initial position and flight conditions for a problem, establish the geographical locations of radio stations and airfields, create emergency conditions by initiating failures of any of the aircraft's equipment, and observe and evaluate the pilot's and co-pilot's reactions to verbal instructions, flight problems, and emergencies. In addition to introducing flight conditions and causing failures, the instructor also acts as the radio station operator and the ground radar station operator. Included in the instructor's facilities are plotting boards which automatically record the flight path at all times. Also provided are official airways charts that can be projected on the plotting board, so that a flight problem in an actual geographical area can be performed.

An analogue computer is highly adaptable for a device of this kind since most conditions of the flight of an aircraft can be described by means of equations involving simple mathematical operations such as addition, subtraction, multiplication, division, integration and differentiation. The basic principles of operation are simple although relatively new. Nothing more complex than ordinary 60 cycle voltage are used to represent mathematical quantities and the specific mathematical operations are performed by analogy; i.e. the voltages used represent the terms of equations which may be in feet, pounds, seconds or degrees.

## tonight

This man could almost reach the moon tonight...for he stands at the brink of a new age in the conquest of space, and he knows this:

If we had to, we could get him there. Given time and urgent need, we could design, build and deliver the total solution to that problem.

An entirely new development in the aircraft industry now makes this possible. It is a science and a method of developing aircraft, guided missiles and electronic systems not as traditional flying vehicles but as fully coordinated solutions to operations problems.

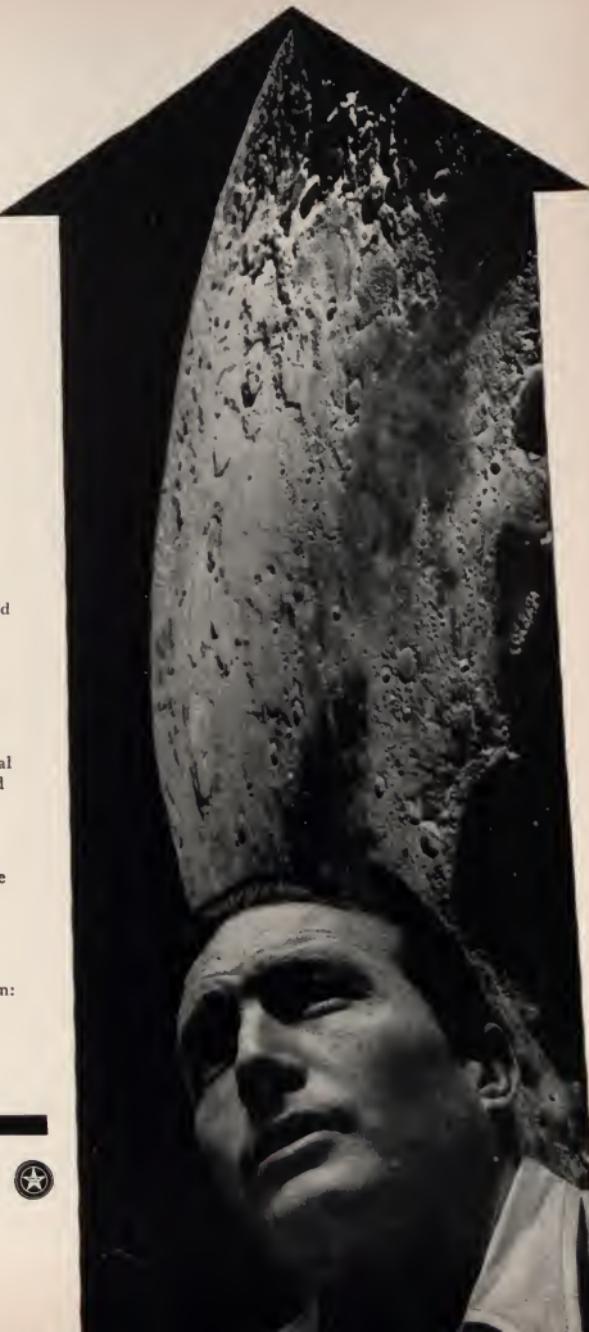
Today, The Glenn L. Martin Company's creative engineering resources and production facilities are among the finest in the new world of weapons systems development.

And one of the reasons for Martin's dynamic future in this new world is basic to leadership in any organization:

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The ASCE student Chapter met on October 6. After the business meeting Professor Walther spoke briefly on the Organization, aims and activities of the society. He pointed out that the society was established primarily for the advancement of science and the profession of engineering. He also told of the place of the student branches in the National Society organization.

A technicolor film titled "Columbia Frontiers" was also shown. The flick, made by the Bureau of Reclamation of the Department of the Interior, depicted Grand Coulee Dam together with the irrigation problems existing in the Pacific Northwest.

## OPPORTUNITY FOR THE ASKING

the Bureau sets aside one afternoon each week to give lectures and conduct tours to the various departments within the Bureau so each employee has some understanding of the various projects being carried on. To supplement the lectures and tours given by the agency, the individual department, such as electronics, mechanical testing, optics, metallurgy, etc., for which the student trainee works takes part of one day each week to explain the sections and individual projects under its jurisdiction. Thus, a student who knows the field of his main interest may locate the particular branch of that field which will gain him experience along his particular line, be it research, development, testing, etc.

They are trying to train men who will be of service, both to himself and to the nation so they may justify the money spent on him.

Both the leaders and the followers will earn his keep, but to the leader the Bureau may point with pride and say because of our training this man is a little better, a little surer of himself, because we gave this man a chance to show his mettle the country has profited and a dollar was well spent. Be it research, development, testing or management here is opportunity right in front of your face. Here is "Opportunity for the Asking."

# COLONIAL PUZZLE TRIAD

This page includes a triad of puzzles of interest to the engineer. The first, the Cryptogram, presents a well-known axiom of physics. The second, the Problem, is an exercise requiring simple arithmetic, but good use of the engineer's common sense. And the third, the Crossword, contains key words familiar to the student.

The cryptogram is a message in coded form. The words and letters appear in their proper order and with proper punctuation, but different letters have been substituted for the actual ones. No letter is substituted for more than one other letter, and punctuation marks are the same in the coded message as in the actual one.

One way of approaching this problem is to look for the letter substituted for "E", since this letter normally appears the most often in the English language. Single letter words could only be "I" or "A". From there you're on your own with only your hunches and knowledge of English sentence structure to help you.

The answers for this month's triad will appear in the December issue.

## I. CRYPTOGRAM:

OCN FOGNTWOC (KG STONTFSQ) KR A UAWTNOSB RSNVX SF NHYGNFNFNX ST ONGUF KR OCN RKGBN OCAO OCN RSNVX NHNGOF JKYT A TKGOC UAWT-NOSE YKVN ST OCN RSNVX. UAWTNOSE RSNVX FOGNTWOC SF XNRSTNX AF OCN RKGBN YNG JTSO TKGOC YKVN OCAO OCN RSNVX NHNGOF KT OCN YKVN.

## II. PROBLEM:

There are two gear wheels of exactly the same size. The first is the same size. The first is stationary, the second rotates around it.

## ANSWERS TO OCTOBER TRIAD

I. The Square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides.

II. 29 days.

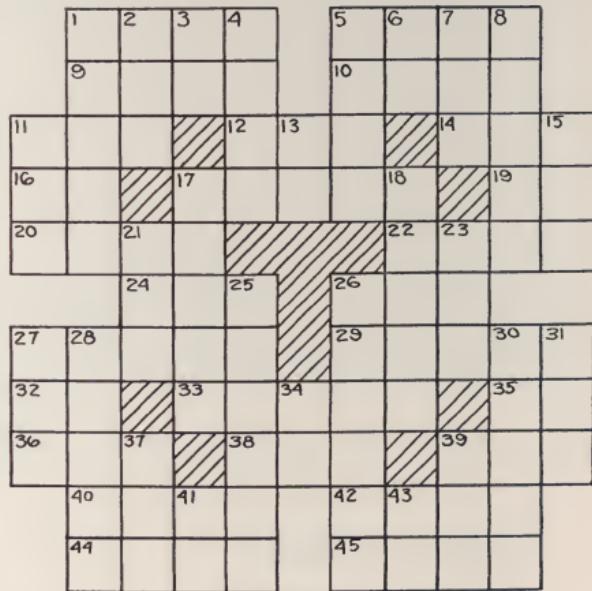
III.

ASME	ASCE
PASS	KIRT
SPY	TRI
AL	TAINT
DEAR	NM
TAU	HASP
SKEIN	SED
IN	ATONE
RUB	TETRA
RATS	OR
LADY	ISLE
SAKS	

How often will the moving gear rotate on its own axle for each complete turn that it makes around the

stationary gear?

(From The Machinist).



## III. CROSSWORD

### ACROSS

- Dam
- Trip
- Cartoonist
- Hard to find
- Greek letter
- Pressure measure
- Physical state
- Pronoun
- Writer of fables
- Elements (symbol)
- Male group (abbrev.)
- At first (arch.)
- Girl's name
- Snake
- Structural material
- Go into
- Element (symbol)
- Religions
- Element (symbol)
- Watch chain
- Take in
- Clothe
- Container
- Exclamation of surprise
- Taxi
- Conveyed

### DOWN

- A fluid
- Age
- Preposition
- Small cable
- Group of three
- Element (symbol)
- Energy unit
- English poet
- Potential unit
- Prefix for name of US ships
- Place oneself
- Book of maps
- Peasants
- Behind
- Rodent
- Russian river
- Improve
- Magnetic force (abbrev.)
- Father of Methuselah
- Wear away
- Old cloth
- Element (symbol)
- Cry of sheep
- Small frog
- State (abbrev.)
- Start

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## NEW MICROSCOPE

The R. C. A. Corporation has produced a new microscope that will permit study of particles smaller than 10-millionth of an inch diameter. Photographs taken by an automatic camera contained in the instrument can be enlarged up to 200,000 times the size of the specimen—a scale at which an ordinary dime would measure more than two miles across. The previous type of electron microscope, with which the polio virus was observed for the first time, normally provides useful photographic enlargements only to 100,000 times.

## ACCREDITATION

(Continued from page 7)

debts associated with accreditation. We are conscious of our responsibility to insure to the student the best possible opportunity for education, in spite of or in consonance with accreditation. We believe we must continuously evaluate ourselves and our efforts to end of serving you most effectively and efficiently. Insofar as accreditation contributes to this end we are its strong supporters. We do not believe that accreditation can be a substitute for continued effort by the school itself to improve its educational opportunities for you, and so we count our faculty Committee on Self-Evaluation one of our most important activities.

This, in a few words, is the accreditation picture. It is incomplete but honest. If the words arouse your interest to learn more, they will have been worthwhile.

## SENIORS!

Don't forget to . . .

- Sign up for your yearbook picture.
- Buy the 1955 Cherry Tree.

## IN OUR NEXT ISSUE

BILL WEIDEMEYER will give our readers the low-down on pre-stressed concrete. Bill presented this paper last spring in the annual A. S. C. E. student paper contest and walked away with one of the awards.

\* \* \*

KINGSLEY BROWN will shed some light on the gas turbine engine for commercial vehicles. We have heard that the gas turbine is the coming thing in the automotive industry. By next month we will know just how far development in this field has progressed.

Kodak  
SEE IT FAIRLY



Illustration shows test of aircraft compass at United States Gauge, division of American Machine and Metals, Inc. A magnetic force, developed by the loops, pulls the compass card 30° off its normal heading. Then the force is released. The instant of release and the moment the compass recovers by 5° are both recorded on the film—become positive evidence of proper performance.

## Wanted: an inspector with a split-second eye *—photography got the job*

A difference of 2/10ths of a second means the compass passes or fails. So the maker pits it against a stop watch—gets definite proof of performance with movies.

Uncle Sam said this aircraft compass must respond by 5 degrees in not less than 1 second or more than 1.2 seconds. That's only 2/10ths of a second leeway—far too little for human hands and eyes to catch the action accurately.

So, side-by-side, the stop watch and compass act their parts before the movie camera. Then individual frames along the film show the precise instant that the 5-degree mark is reached.

Product testing and quality control are naturals for photography. They are typical examples of the many ways photography works for businesses, large and

small. It is improving production, saving time, reducing error, cutting costs.

Graduates in the physical sciences and in engineering find photography an increasingly valuable tool in their new occupations. Its expanding use has also created many challenging opportunities at Kodak, especially in the development of large-scale chemical processes and the design of complex precision mechanical-electronic equipment. Whether you are a recent graduate or a qualified returning service man, if you are interested in these opportunities, write to Business & Technical Personnel Dept., Eastman Kodak Company, Rochester 4, N. Y.

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*Looking ahead with General Electric*



45,000 G-E people working on jobs created by new products since 1945 could almost fill Princeton's Palmer Stadium.

## **In 9 years, new products created G-E jobs for enough people to fill a football stadium**

**Coming years promise even more progress.**

One out of every five people at General Electric owes his job to products G.E. didn't make before 1945. And the future looks even brighter.

We can see new and exciting possibilities in many different fields. Atomic energy, jet engines, electronics, silicones—all promise to create new products, new processes and new jobs.

As we see it at General Electric, America's industrial progress in a free economy is not only continuing, it's rapidly accelerating.

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